Considerations for the control and elimination of mpox in the WHO European Region update 25 April 2023: the need for integrated national operational plans

World Health Organization
European Region

Monkeypox policy brief series

The WHO Regional Office for Europe mpox policy brief series summarizes policy recommendations, knowledge and interim technical guidance on key policy areas around the monkeypox public health emergency of international concern in the WHO European Region. The briefs do not replace technical reports or guidance documents but provide information relevant to the European context in an accessible format.

This document is an update and extension to WHO's first policy brief on Considerations for the control and eventual elimination of mpox in the WHO European Region *(1)*. It is intended to provide a framework for MS to develop national five-year action plans to sustain control and achieve elimination of mpox.

It is aimed at decision-makers and policy-planners, including multisectoral coordination mechanisms established to respond to the mpox outbreak in the WHO European Region. The brief also outlines specific activities derived from the temporary recommendations issued by the WHO Director-General in relation to the multi-country outbreak of mpox following the fourth meeting of the International Health Regulations Emergency Committee on 15 February 2023.

The brief was circulated internally and externally for review with key partners.

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Abbreviations

CSO	civil society organization
ECDC	European Centre for Disease Prevention and Control
EQA	external quality assessment
GBMSM	gay, bisexual and other men who have sex with men
GISAID	the Global Initiative on Sharing All Influenza Data
GSD	genetic sequence data
IHR	International Health Regulations (2005)
IPC	Infection Prevention and Control
LBGTQI+	lesbian, gay, bisexual, transgender, intersex and queer

MPXV	Monkeypox virus
MS	Member States
PCR	polymerase chain reaction
PEPV	post-exposure preventive vaccination
PPV	primary preventive vaccination
RCCE	Risk communication and community engagement
STI	sexually transmitted infection
TESSy	The *E*uropean *S*urveillance *Sy*stem

Executive Summary

Mpox is an infectious disease caused by the Monkeypox virus, an orthopoxvirus that transmits from person to person through close contact, with an as yet unrecognized animal reservoir in west and central Africa. Since May 2022 there has been a global multi-country outbreak with sustained person-to-person transmission including in the WHO European Region. This has been primarily, but not exclusively amongst gay, bisexual and other men who have sex with men (GBMSM), driven predominately through direct and sexual contact in a range of settings.

With the successful reduction in mpox transmission across the European Region, and as Member States (MS) start to transition out of the emergency phase of the outbreak, it is uncertain what will happen next. With significant mpox transmission still occurring in endemic and newly affected countries elsewhere, it is likely that continued reintroduction of mpox into Europe will occur, with the potential of developing into new localized or dispersed outbreaks. The risk of resurgence in previously affected groups will be further compounded as large and mass gathering events that involve elements of sexual contact, commence again in Spring 2023. Furthermore, a new animal reservoir may be established if local transmission remains unchecked.

This document is an update and extension to WHO's first policy brief on Considerations for the control and eventual elimination of mpox in the WHO European Region *(1).* It is intended to provide a framework for MS to develop national five-year action plans to sustain control and achieve elimination of mpox. Central to the outlined approach is the need for MS to move from outbreak management to longer term disease prevention and control programmes, with a specific emphasis on links to broader sexual health initiatives and with the engagement of relevant community groups as well as services that address social determinants of health as a bridge to accessing sexual health services (e.g. transgender health).

The document outlines what actions MS need to undertake to prepare for the forthcoming spring–summer season to achieve and sustain the interruption of person-to-person transmission of mpox.

MS need to maintain high-quality national surveillance systems with integrated laboratory diagnostics and develop and implement multicomponent prevention and control plans linked to established HIV and sexual health services. These plans need to be built with the key affected communities, including GBMSM, sex workers and trans people, through meaningful involvement of civil society organizations (CSOs) representing and serving them. The plans should also consider barriers in accessing care and prevention initiatives for members of groups that are marginalized, for example due to migration status, homelessness or drug use. Plans need to include strong risk communication and community engagement to ensure acceptance and sustained uptake of available preventive measures amongst affected groups; ensure suspected cases are rapidly identified and investigated with optimal clinical and public health management; identify mass gatherings that may be appropriate for targeted interventions with CSOs and event organizers; ensure equitable access and high utilization of vaccines by groups and individuals at disproportionate risk of infection; and ensure that public health interventions, including clinical care, are conducted without stigma and discrimination. This is an interim document and is subject to change as and when new evidence comes to light, and to align with global mpox strategies.

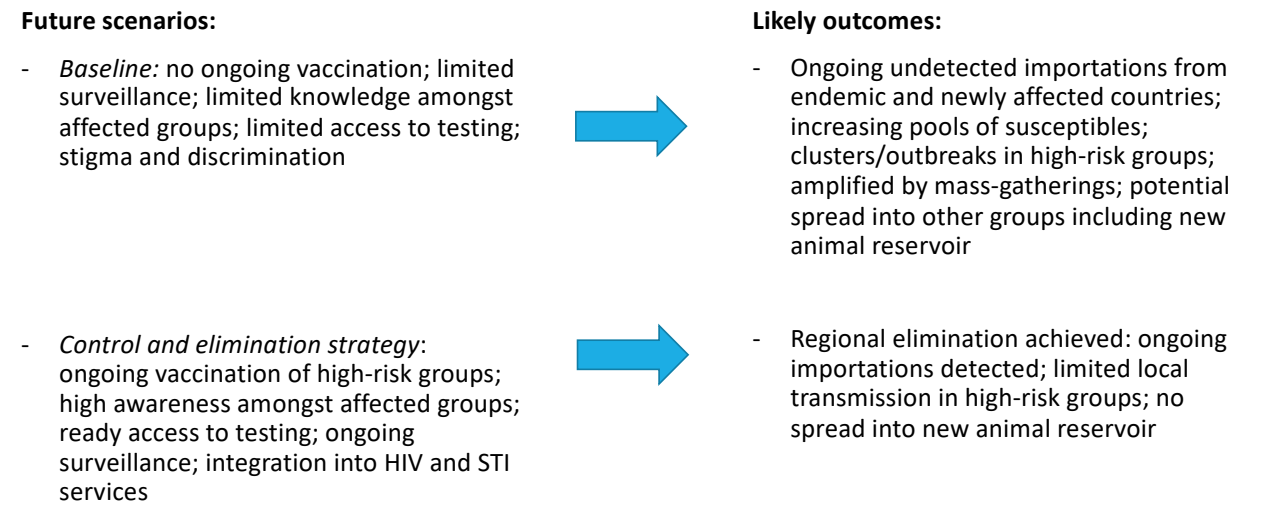
Mpox in the WHO European Region, April 2023: current situation and what might be expected next

Mpox is an infectious disease caused by the Monkeypox virus (MPXV), an orthopoxvirus, that can spread from person to person through close contact, including sexual contact, which may for some outbreaks in some contexts have a zoonotic origin. In a few countries of east, central and west Africa, there may also be limited zoonotic transmission of mpox leading to outbreaks in humans, and whilst the animal reservoir remains unknown, various small mammals such as squirrels are thought to maintain the virus in forested areas. Cessation of routine universal childhood smallpox vaccine programmes with smallpox eradication during the 1980s has resulted in the majority of those born since having no cross-protective immunity in the European Region. In May 2022 widespread sustained mpox circulation across the European Region and in other previously non-endemic Member States (MS) affecting primarily but not exclusively gay, bisexual and other men who have sex with men (GBMSM) was identified. This was driven predominately through direct and sexual contact in a range of settings, including parties and other small and large events. Communities of trans and gender diverse people linked to the same sexual networks have also been significantly affected, although the impact of mpox on this population is still under-studied *(2).*

A global multi-country upsurge in mpox cases was observed from May 2022, peaking in week 28 of that year in the European Region (when 2594 cases were notified in a single week), followed by a sustained reduction in case numbers. The reasons behind the observed decrease in transmission have yet to be disentangled but is likely due to a combination of improved case detection with associated clinical and public health management; acquisition of natural and vaccine-derived immunity and wider behaviour change amongst affected communities following public awareness campaigns and the mobilization of civil society organizations (CSOs). By April 2023 the caseload had reduced significantly across the European Region, with many MS no longer observing sustained local person-to-person transmission, although several are still observing low-level indigenous transmission predominately amongst GBMSM *(3).* In the four weeks preceding 4 April 2023 only 28 cases of mpox were identified from seven countries and areas in the European Region. MS continue, however, to see importation of cases from either newly affected countries or from countries or from countries in Africa that also have human-to-human transmission.

It is uncertain what will happen in the coming months and indeed years, as these importations will continue from affected MS. Reinfections may occur, and large and mass gathering events will start again this spring and summer. There is a potential risk of an increase in incidence in key populations such as GBMSM, youth not previously exposed, and trans people with multiple sexual partners, sex workers and other underserved groups if intervention measures adopted over the past year in relation to prevention, surveillance, treatment and control are scaled down or stopped (Fig. 1). As MS transition out of the emergency phase of the 2022–2023 outbreak, it is important that the successes achieved over the past year are sustained and that medium- to long-term control and prevention plans are put in place to maintain these achievements and to rapidly detect and appropriately manage any future cases and clusters of mpox. The Fourth meeting of the International Health Regulations (2005) (IHR) Emergency Committee on the Multi-Country Outbreak of monkeypox (mpox) on 9 February 2023 provided a series of updated Temporary Recommendations as a framework for MS to develop these medium- to long-term plans to achieve and sustain the interruption of sustained person-to-person transmission *(4).*

Fig. 1. Scenarios and likely outcomes



Notes: STI; sexually transmitted infection.

The need for medium-to long term operational plans

The purpose of this policy brief is to outline what MS in the WHO European Region need to undertake to prepare for the forthcoming spring and summer, and the medium- to long-term requirements to achieve and maintain the interruption of sustained person-to-person transmission of mpox. This follows the WHO Regional Office's previous policy brief on the Considerations for the control and elimination of mpox in the WHO European Region *(1).* It is intended to provide a framework for countries to develop five-year national action plans (Annex, Fig. A1)

Preparing for the spring/summer season and achieving and sustaining eventual national and regional elimination

The overall objective is for MS to prevent a further upsurge of mpox cases this spring and summer and ultimately achieve and sustain the elimination of mpox infection across the WHO European Region. This will be evidenced by the absence of sustained local person-to-person transmission in the presence of high-quality national surveillance systems with integrated laboratory diagnostics with the absence of a new animal reservoir. The levels of mpox transmission used to monitor progress by MS are outlined in Fig. 2, with proposed definitions of national and regional elimination given in Fig. 3 in the absence of a local animal reservoir.

Fig. 2. National transmission levels[a]

Level 1a	Country has **not detected a human case with onset** in the three previous months[b]
Level 1b	Country has only **detected imported[c] or import-related[d] cases** with onset in the previous three months
Level 2	Country is experiencing **sustained local human-to human transmission,** (with case(s) with no epidemiological link to an imported case) with onset in the previous three months

[a] in the absence of a local animal reservoir
[b] Two maximum incubation periods plus a period of enhanced surveillance to a total of 90 days.
[c] Case has history of travel from an mpox-affected country in the three weeks before disease onset and no known local epidemiological link.
[d] Case or cluster is epidemiologically linked to an imported case through a chain of transmission.

Fig. 3. National and Regional elimination targets

National elimination

A MS of the WHO European Region has achieved Level 1a or b with only *imported*[a] or *import-related*[b] cases/clusters with onset in the previous three months and no local animal reservoir

Regional elimination

All 53 MS of the WHO European Region have achieved Level 1a or 1b with only *imported*[c] or import-*related*[b] cases/clusters reported with onset in the previous three months

[a] Case has history of travel from an mpox-affected country in the three weeks before disease onset and no known local epidemiolocal link.
[b] Cases/clusters are epidemiologically linked to an imported case through a chain of transmission.
[c] Case has history of travel outside the WHO European Region from mpox affected area in three weeks before disease onset and no known local epidemiolocal link.

Each country will need to develop and implement an interdisciplinary and multiagency preparedness and response plan linked with sexual health and HIV programmes, and other key health sectors. As part of the development and implementation of a successful plan, strong engagement is needed with groups that have been affected and are at disproportionate risk of infection, particularly GBMSM, sex workers and trans people, as well as the CSOs that represent and serve them. It is important to ensure there are links to broader sexual health initiatives with the engagement of relevant community groups as well as services that address social determinants of health as a bridge to accessing sexual health services.

As of 4 April 2023, 47 countries or territories have achieved Level 1a transmission, two countries Level 1b, and 13 countries remain at Level 2. The key measures of success will be that by 2027 (5-year horizon), 80% of WHO MS in the WHO European Region have developed and implemented context-appropriate national plans for the control and elimination of mpox and that Regional elimination will have been achieved and sustained, with all MS reaching transmission Level 1a or 1b with the continued absence of a local animal reservoir.

Key components of integrated operational plans

Below, the background for, key objectives, challenges and solutions, as well as the monitoring and evaluation indicators for each of the key components of integrated operational plans are presented. These components are surveillance, laboratory, risk communication and community engagement (RCCE), public health interventions, vaccination, clinical management, infection prevention and control (IPC), One Health and coordination and leadership. A summary of the objectives and monitoring and evaluation indicators for each component can be found in the Annex, Table A1 and A2, respectively.

Surveillance

All MS need to ensure that strong national surveillance for mpox is maintained or strengthened where necessary. Surveillance should aim to promptly detect, investigate and report all confirmed mpox cases – including both those that are imported and locally acquired – to interrupt or prevent the reestablishment of sustained local transmission.

Key objectives

The key surveillance objectives are to:

- rapidly identify, investigate and test all suspected cases and clusters of mpox (imported and locally acquired);
- monitor trends, detect changes in epidemiology and facilitate timely, appropriate and targeted public health action;
- monitor recent travel history, and most likely mode of transmission of all cases and reinfections.;
- identify and monitor the epidemiology of mpox in the main affected groups;
- detect infections and transmission chains in other population groups through other transmission routes (e.g. health workers, women and children);

- determine the vaccine history of all cases to monitor vaccine and immunization programme performance;
- monitor outcome, in particular measures of severity including hospitalization, mortality and sequelae by affected group (including GBMSM, sex workers and trans people); and
- monitor exposure of animals to human mpox cases and coordinate with animal health authorities the testing and management of exposed animals.

For disease surveillance purposes, each country should ensure that WHO standard case and death definitions are adopted *(5)* and that case-based information is collected and reported on laboratory confirmed and probable cases to the WHO and the European Centre for Disease Prevention and Control (ECDC) through the European Surveillance System (TESSy) platform on a regular basis, supplemented with event-based surveillance through channels established under the IHR.

Surveillance data will enable monitoring of control and elimination targets. Each country will need to use epidemiological data to regularly assess its level of mpox transmission (Fig. 2).

Key challenges and solutions

- One challenge is suboptimal case detection due to a lack of awareness of infection; barriers to health services; lack of access to testing for affected and underserved populations (including GBMSM, trans people and sex workers); testing and diagnostic limitations; fear of stigma and discrimination by the affected communities; and the lack of cultural competences in diversity of some health providers and public health officials. Solutions include improving early detection capacity and capability by raising awareness of mpox transmission through targeted risk communication for key affected groups with proactive anti-stigma messages from governmental institutions; the training of health workers in cultural competencies; partnering with HIV/ sexually transmitted infection (STI) services and community organizations.
- Mpox may not be a nationally notifiable disease and there may be limited national resources and capacity to conduct detection, investigation and surveillance activities. The solution is to ensure that mpox is nationally notifiable to ensure resource allocation to facilitate early detection and response to outbreaks.
- The current lack of availability of an effective rapid diagnostic test for use at the population level, and remaining gaps in testing capacities in some MS remain a challenge. There is a need to improve access to reliable, affordable, and accurate diagnostic tests In case such a point-of-care product may become commercially available, its use as part of broader HIV/STI screening and detection may be considered in accordance with country regulations, during an outbreak.

WHO guidance on surveillance, case investigation and contact tracing is available here *(5).*

Monitoring and evaluation indicators

The surveillance monitoring and evaluation indicators, include the:

- number of suspected cases identified per month;
- percentage of suspected cases tested (target: >95%);
- number of local laboratory-confirmed cases per month;
- proportion of confirmed cases with complete information for selected variables (travel history, age, gender and date of onset) reported to WHO and the ECDC through TESSy (100%).

Laboratory

Countries need to ensure rapid access for suspected cases to safe and quality-assured orthopox virus and/or MPXV specific diagnostics using nucleic acid amplification testing, such as real-time or conventional polymerase chain reaction (PCR). Genomic sequencing of the virus, with the sharing of genetic sequence data (GSD) with relevant metadata through publicly accessible databases, will be important to monitor virus evolution and to track the evolution of the epidemic.

Laboratory guidance is available here *(6).*

Key objectives

The two key laboratory objectives are to:

- ensure rapid and equitable access to safe and quality-assured MPXV real-time PCR testing for all suspected cases either through in-country testing or through access to the network of international referral laboratories; and
- undertake genomic sequencing of the virus and report genetic characterization data for all or at least a subset of human laboratory-confirmed cases and all animal cases in publicly accessible databases such as the Global Initiative on Sharing All Influenza Data (GISAID).

Key challenges and solutions

- The real-time PCR reagents procured and distributed to some MS in need will be expiring soon and some MS have difficulties with local procurement of these reagents. This may undermine national testing capacity for MPXV. WHO will conduct periodic needs assessments with priority countries and support local and regional procurement of mpox diagnostic reagents, provided funding is available. National authorities may consider mobilizing resources and strengthening local procurement mechanisms for MPXV-related laboratory reagents and supplies.

- Sequencing capacities in MS, despite significant recent progress due to the COVID-19 response, remain uneven: where it is available, GSD are not always shared through publicly accessible

databases. WHO will continue providing support in terms of training (including training on uploading GSD to GISAID); procurement of sequencing reagents and, in some cases, equipment; and facilitating links to international referral laboratories.

- Public health and animal health laboratories in many MS have very limited experience with testing for MPXV, which may potentially lead to issues with the quality of test results and safety of the testing process. Quality and biosafety management systems in the MPXV-testing laboratories should be continuously monitored with laboratory performance monitored through domestic or international external quality assessment (EQA) programmes. In line with this, WHO is coordinating a global EQA programme that will include laboratories from the WHO European Region.
- Many countries lack a decentralized network of MPXV-testing laboratories, which may limit access of patients to testing and undermine equity. For those countries, bringing testing closer to patients by means of point-of-care or rapid diagnostics could significantly improve access – WHO will continue monitoring developments in this area. The United States Food and Drug Administration recently published an emergency approval for the Xpert MPOX test *(7).*
- In some settings, individuals may not be able to easily seek medical attention or laboratory testing for MPXV due to access barriers, including the risk of social stigma. Any locations involved in the sampling or analysis of biomedical samples should abide by strict rules of data protection for patient information, and privacy for the sample collection and testing process where possible, while ensuring equal access to services for members of key affected populations and marginalized individuals.

Monitoring and evaluation indicators

The laboratory component monitoring and evaluation indicators include:

- having national MPXV testing capacity in place (at least one laboratory at the national level that has all necessary resources to test for MPXV on human and animal samples using real-time PCR, including trained staff, equipment, reagents and supplies or direct access to an international referral laboratory);
- participation in domestic and/or international orthopoxvirus and differentiation assays using real-time PCR EQA programme(s);
- percentage of MS with reported cases of mpox that shared MPXV GSD on publicly available databases (100%).

RCCE

The community response to mpox has been extremely robust, with actions at community level taken in a timely manner through CSOs, civil society networks and trusted groups, mostly established to prevent HIV and other STIs, with a very clear anti-stigma and discrimination lens and to promote the rights of lesbian, gay, bisexual, transgender, intersex and queer (LBGTQI+) individuals.

Temporary lifestyle changes are still a way unvaccinated individuals can protect themselves as a harm reduction measure, although challenging to maintain in the long term. This approach can also present challenges in communicating risks to people in countries where vaccination is not widely available. This is particularly relevant in light of experiences from HIV and STIs, where individual counselling of behavioural interventions aimed at changing behaviours alone have not shown to be effective in reducing incidence or risk behaviour such as condom use and needle sharing *(8).* Instead, information-sharing and counselling should be provided in a non-judgmental manner, alongside other prevention interventions and with involvement of peers.

As the outbreak has evolved, many of the most health literate members of the affected communities have taken measures to inform and protect themselves against mpox. Efforts must be made to reach underserved groups and marginalized members of these communities, such as, ethnic minorities, migrants, younger people, people experiencing homelessness, rural dwellers, people who use drugs, sex workers and trans people. Innovative and targeted approaches that bring public health advice and services to groups at higher risk tend to work best. This can be done by meeting people where they are, for example, at mass gatherings or through community outreach. For some people, even a sexual health clinic can be associated with stigma. Social services such as housing or food assistance can also provide opportunities for outreach to underserved groups. The strategic outcome of RCCE for mpox control and elimination is that acceptance and uptake of mpox-related preventive measures among groups most affected and at disproportionate risk are increased and sustained.

Key objectives

The key RCCE-related objectives include to:

- focus RCCE activity on the most affected groups and events of most significance, i.e. mass gatherings that may facilitate sexual activity such as fetish festivals, circuit parties, cruises, or those that allow to reach a high number of community members such as Pride events, alternative Prides and Trans Prides;
- maintain risk perception among the most affected and susceptible groups by communicating that mpox still represents a serious health risk and that they still have options to protect themselves, and by increasing acceptance of public health interventions such practicing safer sex, testing and contact tracing;
- make the link with preventive measures relevant to HIV and other STIs (e.g., pre- and post-exposure prophylaxis and condoms) to scale up key prevention measures and improve the health outcomes of those affected, especially during outbreaks or preventive vaccination activities;

- reach marginalized members of affected groups as working with groups that have not fully or not yet been involved in the response can inform where gaps may be and how to best tackle stigma;
- engage HIV and sexual health service providers along with general practitioners, as mpox begins to be integrated into national STI programmes;
- continue to work with relevant CSOs to reach target groups, including strengthening links with HIV prevention, LBTQI+ rights, and adolescent and youth related CSOs, and use trusted messengers and event organizers catering to the affected communities to amplify public health advice for the prevention and control of mpox;
- maintain high levels of vaccine acceptance by furthering trust between communities and health authorities through transparency about vaccine availability, access and eligibility criteria, as well as vaccine safety and effectiveness and by promptly addressing any concerns; and
- strengthen RCCE capacity at national level and share best practices – as public attention has faded, strengthening RCCE capacities can empower health authorities to engage the most affected and susceptible groups, and tailor the response to their needs and local situation.

Recommended RCCE interventions

With the forthcoming spring–summer season, opportunities for the virus to spread are likely to increase. RCCE options for countries to control and eliminate mpox include:

- expanding outreach to those groups that have been less engaged in the response so far (e.g. adolescents, sex workers, trans communities, refugees and migrants);
- strengthening partnerships with relevant CSOs and supporting them financially;
- collaborating with organizers of festivals, parties, and other large and mass-gathering events and owners of sex-on-premises/commercial sex venues, to promote information among employees and attendees;
- engaging health workers and community outreach workers as a trusted source of health advice about the prevention and treatment of mpox, for members of key affected populations attending health services;
- supporting HIV and sexual health services to deliver public health advice to higher-risk groups on the importance of protective measures, testing, contact tracing (also partner notification), and access to treatment;
- diversifying outreach channels to include apps and websites used by key affected groups (e.g. dating apps or websites of sex-on-premises/commercial sex venues as well as trans-led and sex worker-led organizations);
- revamping vaccination strategies to transparently communicate eligibility criteria and vaccine availability, as well as to extend reach to marginalized populations or groups that may face barriers; and

- continuing social listening to monitor perceptions and behaviours and consistently inform the response – active and close engagement with organizations representing and serving GBMSM, trans people, sex workers and the marginalized members of these groups is essential to tackle

stigma and ensure easy access to high-quality, culturally appropriate and evidence-based public health advice and public health services.

RCCE guidance and tools to support this are available at:

- Mpox Risk Communication Toolkit for event organizers *(9)*.
- Interim advice on Risk Communication and Community Engagement during the monkeypox outbreak in Europe, 2022 *(10)*.
- Risk communication and community engagement approaches during the monkeypox outbreak in Europe, 2022 *(11)*.
- Risk communications and community engagement interim guidance on using inclusive language in understanding, preventing and addressing stigma and discrimination related to monkeypox *(12)*.

Key challenges and solutions

Vaccination – Due to limited availability of vaccines, prevention continues to be key to interrupt mpox transmission. There is space for MS to increase communication on eligibility criteria, supply, and vaccination site locations whilst ensuring the privacy of those receiving the vaccine. Self-reported risk factors such as having multiple sexual partners can be an effective approach to help identify appropriate targets for vaccination within broader key groups. An important aspect of mpox prevention and preparedness for the European Region should be innovative outreach for vaccines to bring them to where people are and reach underserved groups as well as adolescents and younger adults. Efforts to promote safer sex practices, contact tracing and testing should be considered alongside vaccination.

Risk perception – While risk perception seems sustained among most affected groups, it has almost totally faded in the general population. It is critical to keep mpox protection on the broader agenda, while targeting interventions to the most affected groups. Communications to mass and social media can support general message deployment but must be done carefully so as not to inadvertently sensationalize the issue or otherwise perpetuate any harmful stereotypes that may linger from the 2022 outbreak. At the same time, the engagement and support of CSOs remain essential to expand outreach to higher-risk population groups that have been less engaged so far. The WHO Regional Office for Europe will support these efforts by updating the mpox toolkit for health authorities and event organizers based on the current situation. Health workers can restart talking about mpox with patients who may have higher risk exposure following the drop in cases that we saw last autumn and winter.

Stigmatization – There is a continued risk of stigmatization, which needs to be addressed by monitoring any increased negative sentiment toward GBMSM, trans people and sex workers, and by using respectful and inclusive language that does not link disease transmission to sexual orientation or gender identity, but only to risk exposure (in particular multiple sexual partners). The public sentiment needs to be monitored to promptly detect and address any rumours and misinformation (e.g. the myth that mpox spreads in the same way as COVID-19). In the control and elimination strategies at national level, partnership with LGTBIQ+ communities and underserved groups are essential. To build trust, this should

be accompanied by proactive anti-stigma messages from governmental institutions dealing with the response. Groups negatively affected by stigma such trans people and sex workers should be considered alongside GBMSM as target groups. It is important to address the negative stereotypes of sex workers and trans people as this not only harms them but also other marginalized communities. Organizations who support groups at risk such as trans persons or sex workers can play a vital role in informing people about mpox and advising on inclusive language for materials.

Outreach – Engagement of sexual health service providers specific to GBMSM, trans people and sex workers remains limited and stigma and discrimination towards these groups are commonly reported in health-care settings. Funding community interventions in priority countries can be a solution.
Efforts need to be made to reach communities in non-sexual health spaces as well (e.g., delivery of other services such as housing, food assistance, harm reduction services related to drug use, gender-affirming care, etc.). These can provide an entry point for health authorities to incorporate STI/HIV/mpox testing, information, and intervention, as well as mpox vaccination.

Monitoring and evaluation indicators

The RCCE monitoring and evaluation indicators include the number of:

- opportunities created to hear community feedback;
- knowledge products produced featuring RCCE and tools developed to support MS in implementing RCCE approaches;
- social listening and infodemic management reports;
- proactive and reactive media interactions and social media content pieces; and
- mass and large gathering events sharing mpox public health advice with event participants.

Public health interventions

Rapid identification of cases as well as tracing and notification of contacts remain key priorities for stopping transmission of mpox through behaviour change and post-exposure preventive vaccination (PEPV) for contacts, if available. Timely identification of cases and contacts should be based on proactive awareness raising and dedicated community engagement to minimize stigma related to mpox and its transmission.

A particular emphasis should be placed on preparedness for large and mass gathering events, notably those where close and/or sexual contact with multiple partners may occur, as these events have been seen to provide an opportunity for transmission amplification, as seen during the spring and summer of 2022. Further similar mass gathering events from spring 2023 onwards will provide a further potential opportunity for renewed transmission as well as international spread. At the same time, lessons from outbreaks spread through social and sexual networks have shown that cancelling organized gatherings is likely to be counterproductive to disease control efforts. Venue closure or event cancellation does not reduce sexual contacts but rather shifts the activities to other settings. Engaging with populations at increased risk of infection through the organized events represents a powerful opportunity for mpox

control and prevention activities and make planned events safer. By working with organizers of events and CSOs from the planning stage, the potential risks related to mpox can be communicated, and clear, practical, targeted information provided to attendees. Therefore, MS are strongly encouraged to place emphasis on risk assessment, planning and risk communication before, during and after large/mass gatherings.

Key objectives

The key objectives for public health interventions should focus on cases, contacts and mass gatherings.

- Provide readily accessible information about mpox transmission, symptoms and opportunities for testing in MS to rapidly identify new cases of mpox and to subsequently inform positive cases about the recommended precautionary measures, which is a fundamental step to limit and eventually stop disease transmission.
- Integrate awareness raising, testing, case investigation and contact management into other infectious and non-infectious diseases services that touch affected communities, where feasible and appropriate, including existing STI and HIV programmes and services.
- Offer HIV and STI testing wherever possible along the continuum of prevention and care for mpox; where available provide linkage to care for HIV pre-exposure prophylaxis.
- Ensure high levels of awareness of mpox, in particular in specific settings, e.g., through engagement of local communities and CSOs as described in the RCCE section.
- Ensure that all cases are rapidly informed of their status to enable close contacts to be able to seek medical advice and follow public health advice.
- Engage mpox positive cases in partner notification to reduce onward transmission.
- Ensure that contacts are informed about the necessity of self-monitoring for symptom development and about relevant precautionary measures during the incubation period.
- Consider timely vaccination (i.e. before attending the event) and post-exposure preventive vaccination for certain categories of contact, depending on the national strategy and recommendations.
- Ensure that contacts of mpox cases are rapidly informed of exposure status either through partner notification or by public health authorities (see WHO guidance *(5)*).
- As part of broader all-hazards risk-assessment approach for mass gatherings and the opportunities they provide, identify those mass gatherings that may be appropriate for targeted mpox interventions and work with CSOs, local RCCE committees, local public health authorities and event organizing committees to roll-out prevention and response campaigns. When possible, local health authorities and CSOs should partner to create and implement joint outreach campaigns through trusted proactive messengers against stigma and discrimination specifically before but also during and after mass and large gathering events to enhance delivery to appropriate audiences and maximize the outcome of message content, targeted channels and reach.

- Digital platforms such as event websites, social media, event apps and dating apps should be considered as key channels for effectively communicating mpox public health advice and in mass and large gathering planning and preparedness, where appropriate.
- Evaluate the implementation of public health interventions during and after mass and large gathering events to ensure lessons are identified and used for future planning.

Challenges and solutions

MS should be cognizant about the contextual challenges and solutions related to mpox case investigation and contact management, including that:

- a reduced presentation of suspected cases to medical/sexual health services hinders identification of cases and consequently reduces opportunities for targeted behavioural intervention;
- members of key affected communities and marginalized groups may face significant barriers to access health services and facilities;
- there may be a potential reluctance to share information about the whereabouts of (sexual) contacts or to engage in partner notification efforts;
- anonymous sexual contacts can be a barrier for contact identification and notification;
- financial constraints of CSOs may limit their support of government efforts towards mpox elimination; and
- there may be fragmented and uncoordinated approaches across key stakeholders during mass and large gathering event planning and preparedness.

For mass gatherings, all key stakeholders should be identified and engaged from the outset of event planning and preparedness as a cornerstone to mpox prevention and control.

- Clear communication channels should be used across all stakeholders at all times to ensure quality public health advice is provided to communities of interest, with established CSOs with experience in HIV outreach work and sexual health services viewed as valuable outreach partners who should, where feasible, be financially supported.
- National and international contact tracing should be conducted during and after events.
- Alternative approaches to contact tracing, such as voluntary or anonymous partner notification, may be examined and integrated into national mpox prevention and control strategies. Tools for sending anonymous notifications individually or in batches, also web-based, are available and can increase engagement and adapting national and local guidance relevant to mass and large gathering events during the mpox outbreak to the event and population context including translation of material should be considered with a focus on affected communities.

Monitoring and evaluation indicators

Establishing indicators to monitor and evaluate the performance of case investigation and contact tracing can contribute to improving the performance of these systems and processes. Such indicators could be the percentage of:

- cases for which contacts were reached through contact tracing/partner notification;
- contacts offered PEPV within four days of exposure; and

- mass and large gathering events implementing tailored public health measures and advice for participants.

WHO guidance on surveillance, case investigation and contact tracing is available here *(5)*. WHO guidance and tools on mass and large gatherings are also available:

Public health for mass gatherings: key considerations (*13*).

Interim advice for public health authorities on summer events during the monkeypox outbreak in Europe, 2022 *(14).*

Vaccination

Vaccines when used in combination with other public health measures will contribute to the objectives of the mpox response strategy by interrupting human-to-human transmission among population groups at higher risk of exposure and protecting vulnerable groups at high risk of severe disease. Currently, there are four vaccines that may be considered in the public health response to mpox: two third-generation vaccines approved for use in the prevention of mpox, MVA-BN (Denmark) and LC16 (Japan); a fourth-generation vaccine, OrthopoxVac (Russian Federation) which has also been approved for use in the prevention of mpox; and ACAM2000 (United States of America), a second-generation vaccine approved for the prevention of smallpox. All four vaccines were developed for use against smallpox; evidence of their protection against mpox is still limited, but initial research does point to significant real-world effectiveness. All four vaccines have been approved for use by various regulatory authorities, some of whom are stringent regulatory authorities, for prevention of mpox. MVA-BN is the only non-replicating vaccine used against mpox; it has the fewest number of safety considerations and has no specific contraindications for use in pregnancy, children, or immunocompromised individuals *(15).* Early observational studies have demonstrated that one dose of a third-generation smallpox vaccine provides moderate protection against mpox infection *(16–18)* and reduces the severity of mpox disease after infection *(19)*. One study reported a larger risk reduction among persons who had received two vaccine doses compared to those who received only one dose, and this same study also suggested no difference in protection between intradermal administration and subcutaneous administration routes *(17)*.

However, the number of studies is small and it remains unclear how long-lasting immunity will be. Intradermal injection (0.1mL) of MVA-BN is considered non-inferior to subcutaneous injection and is approved for emergency use by the United States Food and Drug Administration and the European Medicines Agency Emergency Task Force as a dose-sparing strategy during periods of low vaccine availability.

Countries in the WHO European Region vary widely in their health-care and immunization service delivery systems. Countries should make decisions on the vaccination of target groups against mpox according to the local epidemiological and social context, prioritize among these groups for effective use of available vaccines in the evolving context of limited global and national vaccine supply and the level of risk of infection between groups and over time. Immunocompromised people living with HIV who are at increased risk of exposure should be prioritized, as they face a significantly higher risk of severe disease and death after mpox infection *(20).* A national vaccination plan for mpox should be developed by the Ministry of Health in consultation with the national immunization technical advisory group, national regulatory agency, other ministries and agencies, as well as civil society and community-based organizations including HIV/AIDS organizations and LGBTIQ+ advocacy groups and travel health partners. The ministries of health should periodically review and revise the strategy in light of the vaccine availability to ensure equitable access to available vaccines for populations who are disproportionately affected by mpox.

Detailed mpox vaccination guidance for the WHO European Region is outlined in a policy brief *(21)* and global interim guidance on mpox vaccination was published in November 2022 *(22)*.

Key objectives

There are a number of key objectives and principles MS should ensure are considered in the development of a vaccination strategy.

- Equitable and effective pre-exposure access to vaccine (primary preventive vaccination (PPV) and high utilization by groups and individuals at disproportionate risk of mpox infection because of behavioural and/or occupational exposures must be ensured.
    - Strategies for providing PPV should be developed to reach a high proportion of those groups and individuals with the highest risk of exposure. This may be most importantly GBMSM and trans people with multiple male sexual partners but may also include any individuals with multiple sexual partners; sex workers; health workers at risk of repeated exposure; laboratory personnel working with orthopoxviruses; clinical laboratory and health-care personnel performing diagnostic testing for mpox; and others. Self-reported risk factors may be useful to help identify individuals at highest risk of exposure.
    - PPV is not recommended on the basis of higher risk of severe disease alone (e.g. children, pregnant women and immunosuppressed individuals) unless the group is also at high risk of exposure; however when prioritizing among groups at high risk of exposure for PPV vaccination, people living with HIV, especially those who are not virally suppressed or with a CD4 count below 350 cells/mm^3, should be considered high priority.

- Equitable access to PEPV by exposed individuals who are at high risk of developing severe outcomes should be ensured with strategies developed for offering PEPV to non-immune (i.e. unvaccinated and without history of infection) contacts who have had high-risk exposure to an infected and symptomatic case (direct skin-skin, fomite or respiratory exposure). PEPV should be administered within 4 days of first exposure (and up to 14 days post-exposure in the absence of symptoms).
    - Programmatic feasibility in identifying and reaching high-risk sexual contacts to offer PEPV may be affected by challenges related to anonymity or issues related to stigma, or other social or legal inhibitions.
    - In the context of limited availability, PEPV should be prioritized for individuals at highest risk of severe disease after mpox infection (e.g. people living with HIV and other immunocompromised individuals, children and pregnant people).
- The integration of mpox vaccination strategies into non-traditional settings for vaccination (such as sexual health clinics, HIV pre-exposure prophylaxis centres, pharmacies, community-based organizations, sex on premises venues and large gathering events) could be effective in reaching a large proportion of the highest-risk groups being targeted. There may also be a need to establish new vaccine delivery strategies. Any new strategy should be carefully considered to ensure they provide equitable access to marginalized persons among those most susceptible. For example, sexual health clinics may or may not have high utilization rates by higher-risk persons of all ethnicities, experiencing homelessness or using drugs, among others.
- Active and close engagement with relevant technical units in the Ministry of Health, organizations representing and serving the most affected and susceptible groups (including GBMSM, trans people and sex workers) will be needed to ensure that vaccinations programmes are designed and implemented according to the specific needs of those groups.
- Joint risk/benefit analysis and shared clinical decision-making on PPV and PEPV between individuals with their health-care providers, should be ensured based on individualized consideration of the risks of exposure and disease severity against evolving evidence on immunogenicity, effectiveness and safety of available vaccines.
- An effective and tailored communication and advocacy strategy should be ensured, which is based on behavioural insights and designed and implemented in partnership with communities and groups that are disproportionately affected as well as diverse partners already working with affected populations. Such a strategy could include community outreach, education efforts and communication through multiple, appropriate channels focused on behavioural strategies to minimize risk of exposure, eligibility for vaccination and risk and benefits of vaccination. Innovative communications approaches may be needed, such as partnering with dating apps to disseminate prevention messages, including on mpox vaccination.
- Strong systems for detecting, timely reporting and conducting causality assessment of adverse events following immunization with mpox vaccines must also be ensured.

Challenges

A number of challenges and uncertainties exist in developing a national vaccination strategy for the mpox response.

- Mpox vaccine supply in any given location may be limited. Vaccination priority groups are not uniform across countries, may vary over time and often cannot be easily quantified as a denominator. Thus, routine monitoring of the vaccination roll-out will require special data monitoring mechanisms for national immunization programmes to monitor access of mpox vaccine to the target population groups.
- There is residual uncertainty and limited data about immunogenicity and effectiveness, particularly around one versus two-dose schedules, the duration of protection and possible role of booster doses, correlates of protection and effectiveness in previously smallpox-immunized individuals. Approaches to vaccine safety monitoring should be established.

Clinical management

Difficulties related to the differential diagnosis of rash and genital lesions across different clinical disciplines, particularly in relation to atypical presentations of mpox infection, are an ongoing major obstacle to the timely diagnosis of mpox infection. Lack of established clinical pathways for mpox may contribute to substandard or delayed care. Although the majority of cases are not hospitalized, a small proportion, particularly those that are significantly immunocompromised, are at risk of serious complications. Emerging clinical data suggests poorer mpox outcomes and higher mortality in people living with HIV/AIDS with advanced infection and low CD4 counts *(20)*.

Patients should be counselled about signs and symptoms of complications that should prompt urgent care. Conservative treatment of rash lesions should be performed depending on their stage and location. Such treatment should aim to relieve discomfort, control pain, speed up healing and prevent complications, such as secondary infections or exfoliation through the use of antibiotics with activity against normal skin flora, including *Streptococcus pyogenes* and methicillin-sensitive Staphylococcus aureus.

Early administration of antivirals such as tecovirimat in high-risk patients may reduce risk of poor outcome. Use of antivirals should be preferably initiated under randomized clinical trials with the collection of standardized clinical and outcome data to rapidly increase evidence generation on efficacy and safety and, when not possible, antivirals may be used under expanded access protocols, such as the Monitored Emergency Use of Unregistered and Investigational Interventions. The type of marketing authorization, associated post-marketing requirements required by the responsible medicine regulatory authority, as well as the type of use (e.g. off-license use) may differ between MS and should be taken into consideration when devising national guidelines. Early administration of antivirals such as Tecovirimat in high-risk patients may reduce the risk of poor outcome.

Insensitivity to the specific health needs of key affected populations by providers, including disregard for a trans person's gender identity, can be a significant barrier for seeking treatment and care services. Negative attitudes due to sexual orientation, gender identity, sex work, drug use, HIV status, migration status or homelessness, among others, should be addressed to increase access and care retention.

Clinical management guidance is available here *(23).*

Key objectives

The key clinical management objectives are that:

- national clinical management guidelines including the clinical pathway and access to relevant antivirals and reporting requirements are published and disseminated;
- easy access to combined laboratory diagnostic services for differential rash conditions and STIs and/or system for sample transport is established;
- equal access to treatment and care for all affected and underserved populations (including GBMSM, trans people and sex workers) is provided; and
- active or enhanced passive drug safety surveillance for antivirals is instituted and national regulatory authorities regularly assess safety signals and report these to regional and global pharmacovigilance centres.

Key challenges

The key challenges in regard to the clinical management of mpox include:

- concomitant mpox and other STIs
- failure to address stigma and discrimination
- failure to address associated mental health issues
- suboptimal HIV/AIDS therapeutic management in some settings
- no or limited timely access to antivirals in certain settings
- the timely recognition of sepsis.

National authorities are advised to utilize clinical governance to improve quality standards of basic health care delivery and monitor performance across health sector specifically for this scenario.

Monitoring and evaluation

The monitoring and evaluation indicators for clinical management are outlined in the Annex, Table A2.

During acute public health events and at all times, IPC must be present and operational to ensure a safe environment for patients, visitors and health workers. According to the country self-assessments collected through the Tracking Antimicrobial Resistance Country Self-Assessment Survey *(24)*, in 2021–2022, 13 countries in the WHO European Region at all income levels still either did not have a general IPC programme or plan, or they had one but had not fully implemented it. In all, 29 countries had an IPC programme supported by plans and guidelines implemented nationwide, and the majority of these countries also had a mechanism to monitor the effectiveness of IPC programmes and compliance with recommendations.

However, the joint WHO and Organisation for Economic Co-operation and Development briefing paper on IPC with a focus on G7 countries *(25)*, showed that none of the G7 countries reported meeting all minimum requirements for IPC at the national level.

In the context of mpox in the WHO European Region, as of 4 April 2023, WHO and the ECDC have been informed of five cases of mpox infection among health workers following occupational exposure. In four of these cases, health workers were wearing the recommended personal protective equipment but were exposed to body fluid while collecting samples. The fifth case was not wearing personal protective equipment.

Despite the limited number of occupational exposures in health-care settings, having a functional IPC programme at facility and national levels to guide and support the implementation of appropriate IPC measures is essential to mitigate and control the transmission of mpox in health-care and community settings.

Key objectives

The key IPC objectives are to:

- foster and promote IPC as a marker of quality, by implementing the minimum requirements or the core components of IPC programmes;
- establish and execute IPC programmes at the national and facility levels to ensure advocacy, training and data for improvement and sustainability; and
- accelerate implementation by strengthening IPC programmes and infrastructures at national and facility level, improving IPC training and education, strengthening monitoring and surveillance; and using data for action.

Key challenges

The key challenges related to IPC are to;

- establish and maintain IPC on the national public health agenda;
- ensure the sustainability of IPC programmes with the adequate human and financial resources;
- develop evidence-based guidelines adapted to the local context and needs combined with the absence of accessible quality evidence in a national language;
- create or maintain IPC training and education programmes for a broad range of tasks, and levels of education and experience of the health-care workforce
- encourage reporting of health-care associated infections;
- implement IPC measures using multimodal strategies; and
- implement the monitoring and feedback required to ensure IPC interventions are applied.

Monitoring and evaluation

The monitoring and evaluation indicators relevant to IPC are outlined in the Annex, Table A2.

One Health

As a zoonotic orthopoxvirus with an unidentified wildlife reservoir in Africa, there remains a theoretical risk of MPXV spill-over into a new animal reservoir in the European Region, outside of its usual host range in west and central Africa, and with this the potential for spill-back to the human population.

In 2003, an outbreak of mpox in humans was traced to contact with pet prairie dogs that had been co-housed with infected African rodents, imported from Ghana. Contact with wild animals, including live animals, meat products or other products is a risk factor for transmission and the absence of rigorous controls could also lead to similar zoonotic outbreaks in the future, where import controls may not fully eliminate the risk related to the importation of animals or meat from areas with enzootic circulation.

Key objective

There is a need for further strengthening of surveillance at the animal-human-environment interface and implementation of control measures. The key One Health objective is to ensure all MS continue to monitor potential spill-over and spill-back at the animal-human-environment interface.

Key challenges and solutions

The key challenges and solutions with regards to One Health include that:

- the full range of animals that are susceptible to mpox infection is currently unknown;
- there is limited surveillance at the animal-human-environment interface in many MS, which may lead to an increased risk of undetected spill-over and spill-back events;
- there is limited awareness among clinicians and public health specialists that spill-over to certain human populations is possible;

- animal health authorities need to be notified of suspected or confirmed human mpox cases where contact with animals is suspected to ensure timely actions by veterinarians and animal health laboratories – a One Health approach should be adopted to strengthen collaboration between human and animal health authorities;
- animal health laboratories must also be equipped with reagents to detect mpox; and
- IPC and proper waste management measures need to be followed meticulously in health-care settings and laboratories to prevent mpox dissemination in waste that could lead to new virus reservoirs (e.g. in rodents).

Monitoring and evaluation

The key monitoring and evaluation indicators for One Health include the percentage of:

- human mpox cases where animal contacts have been considered during contact tracing activities
- animal MPXV isolates associated with human cases that have been sequenced.

Coordination and Leadership:

All MS are encouraged to ensure appropriate multiagency operational preparedness and response capability is in place, to support the implementation of mpox operational plans and longer-term activities.

Key objectives

The key Coordination and Leadership objectives are to:

- establish a national multi-sector mpox control and elimination plan;
- ensure readiness of the national outbreak response and coordination mechanism;
- integrate mpox in all-hazard preparedness and response planning;
- ensure sustainable financing is in place to integrate mpox in HIV/STI services and enhance outbreak response and coordination systems;
- ensure sustainable financing is in place to integrate mpox in HIV/STI services and enhance outbreak response and coordination systems.

Key challenges and solutions

One of the key challenges is to ensure that adequate resources are available to implement the proposed plan. Large efficiencies can be achieved through integration of proposed activities into existing prevention and control programmes.

Monitoring and evaluation

The monitoring and evaluation indicators relevant to Coordination and Leadership include;

- the development of a national mpox multiagency preparedness and response plan;
- funds allocated to implement the mpox control and elimination plan (including community-based activities);
- policy changes include that mpox is linked to HIV/STI services and mpox is added to the list of national notifiable diseases.

Monitoring and evaluation

Key monitoring and evaluation indicators for each programmatic area within integrated operational plans are needed so that countries can monitor progress in reaching and sustaining targets. These have been introduced within the respective component sections above and are summarized in Annex 1, Table A2.

Applied research requirements

Multi-disciplinary research investment is needed. Key outstanding questions remain across all the technical areas as presented below.

- What was the main driver for the reduction in transmission in summer 2022?
- What is the role of the reduction in the number of sexual partners in mpox control and elimination?
- What are the sensitivity and specificity of new clinical protocols for genital ulcers including mpox management?
- What is the effectiveness of mpox vaccines and antivirals?
- What is the potential future risk of reinfection?
- What are the long-term sequelae of mpox infection?
- How have trans people been affected by the mpox outbreak (infection incidence, hospitalization rate, disease severity and associated factors)?
- What is the level of accessibility of mpox-related health services for the most affected populations (GBMSM, trans people and sex workers)?
- What are the values and preferences of the most affected populations (GBMSM, trans people, sex workers) on the delivery of mpox-related health services?
- What prevents the most affected populations (GBMSM, trans people, sex worker, migrants, ethnic minorities and youth) from presenting for testing?
- What role have CSOs played in the response to the epidemic and the mobilization of communities?

References

1. Considerations for the control and elimination of monkeypox in the WHO European Region: policy brief No.1, 26 August 2022. Copenhagen: WHO Regional Office for Europe; 2022 (https://apps.who.int/iris/handle/10665/361984).

2. Rodriguez-Morales AJ, Amer FA. Monkeypox virus infection in women and non-binary people: uncommon or neglected? Lancet. 2022;400(10367):1903–1905. doi: 10.1016/S0140-6736(22)02396-0.

3. WHO Regional Office for Europe and the European Centre for Disease Prevention and Control. Joint ECDC-WHO regional Office for Europe Mpox Surveillance Bulletin. Copenhagen: WHO Regional Office for Europe; 2023 (https://www.who.int/europe/emergencies/situations/monkeypox/situation-reports).

4. Fourth meeting of the International Health Regulations (2005) (IHR) Emergency Committee on the Multi-Country Outbreak of monkeypox (mpox). In: World Health Organization [website]. Geneva: World Health Organization; 2023 (https://www.who.int/news/item/15-02-2023-fourth-meeting-of-the-international-health-regulations-(2005)-(ihr)-emergency-committee-on-the-multi-country-outbreak-of-monkeypox-(mpox)).

5. Surveillance, case investigation and contact tracing for mpox (monkeypox): interim guidance, 22 December 2022. Geneva: World Health Organization; 2022 (https://apps.who.int/iris/handle/10665/354488).

6. Laboratory testing for the monkeypox virus: Interim guidance, 23 May 2022. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/WHO-MPX-laboratory-2022.1).

7. FDA Roundup: February 10, 2023. In: U.S Food and Drug Administration [website]. Silver Spring; U.S Food and Drug Administration; 2023 (https://www.fda.gov/news-events/press-announcements/fda-roundup-february-10-2023).

8. WHO Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations. Geneva: World Health Organization; 2022 (https://apps.who.int/iris/handle/10665/360601).

9. A Risk Communication Toolkit for Event Organizers. Copenhagen: WHO Regional Office for Europe; 2022 (https://www.who.int/europe/publications/m/item/a-risk-communication-toolkit-for-event-organizers).

10. WHO Regional Office for Europe and the European Centre for Disease Prevention and Control. Interim advice on Risk Communication and Community Engagement during the monkeypox outbreak in Europe, 2022. Copenhagen: WHO Regional Office for Europe; 2022 (https://www.who.int/europe/publications/m/item/interim-advice-on-risk-communication-and-community-engagement-during-the-monkeypox-outbreak-in-europe--2022-(2022)).

11. Risk communication and community engagement approaches during the monkeypox outbreak in Europe, 2022. Geneva: World Health Organization; 2022 (https://www.who.int/europe/publications/m/item/risk-communication-and-community-engagement-approaches-during-the-monkeypox-outbreak-in-europe--2022).

12. Risk communication and community engagement public health advice on understanding, preventing and addressing stigma and discrimination related to monkeypox. Geneva: World Health Organization; 2022 (https://www.who.int/publications/m/item/communications-and-community-engagement-interim-guidance-on-using-inclusive-language-in-understanding--preventing-and-addressing-stigma-and-discrimination-related-to-monkeypox).

13. Public health for mass gatherings: key considerations. Copenhagen: Regional Office for Europe; 2015 (https://www.who.int/publications/i/item/public-health-for-mass-gatherings-key-considerations).

14. WHO Regional Office for Europe and the European Centre for Disease Prevention and Control. Interim advice for public health authorities on summer events during the monkeypox outbreak in Europe, 2022. Copenhagen: WHO Regional Office for Europe (https://www.who.int/europe/publications/m/item/interim-advice-for-public-health-authorities--on-summer-events-during-the-monkeypox--outbreak-in-europe--2022).

15. Duffy J, Marquez P, Moro P, Weintraub E, Yu Y, Boersma P, et al. Safety Monitoring of JYNNEOS Vaccine During the 2022 Mpox Outbreak - United States, May 22-October 21, 2022. MMWR Morb Mortal Wkly Rep. 2022;71(49):1555-1559. doi: 10.15585/mmwr.mm7149a4.

16. Wolff Sagy Y, Zucker R, Hammerman A, Markovits H, Arieh NG, Abu Ahmad W, et al. Real-world effectiveness of a single dose of mpox vaccine in males. Nat Med. 2023 Mar;29(3):748-752. doi: 10.1038/s41591-023-02229-3.

17. Payne AB, Ray LC, Cole MM, Canning M, Houck K, Shah HJ, et al. Reduced Risk for Mpox After Receipt of 1 or 2 Doses of JYNNEOS Vaccine Compared with Risk Among Unvaccinated Persons - 43 U.S. Jurisdictions, July 31-October 1, 2022. MMWR Morb Mortal Wkly Rep. 2022;71(49):1560-1564. doi: 10.15585/mmwr.mm7149a5

18. Bertran M, Andrews N, Davison C, Dugbazah B, Boateng J, Lunt R, et al. Effectiveness of one dose of MVA-BN smallpox vaccine against mpox in England using the case-coverage method: an observational study. Lancet Infect Dis. 2023:S1473-3099(23)00057-9. doi: 10.1016/S1473-3099(23)00057-9.

19. Farrar JL, Lewis NM, Houck K, Canning M, Fothergill A, Payne AB, et al. Demographic and Clinical Characteristics of Mpox in Persons Who Had Previously Received 1 Dose of JYNNEOS Vaccine and in Unvaccinated Persons - 29 U.S. Jurisdictions, May 22-September 3, 2022. MMWR Morb Mortal Wkly Rep. 2022;71(5152):1610-1615. doi: 10.15585/mmwr.mm715152a2.

20. Mitjà O, Alemany A, Marks M, Lezama Mora JI, Rodríguez-Aldama JC, Torres Silva MS, et al. Mpox in people with advanced HIV infection: a global case series. Lancet. 2023;401(10380):939-949. doi: 10.1016/S0140-6736(23)00273-8.

21. Policy brief on vaccination against monkeypox in the WHO European Region: policy brief No.2, 26 August 2022. Copenhagen: WHO Regional Office for Europe; 2022 (https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5988-45753-65829).

22. Vaccines and immunization for monkeypox: Interim guidance, 16 November 2022. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/WHO-MPX-Immunization).

23. Clinical management and infection prevention and control for monkeypox: Interim rapid response guidance. Geneva: World Health; 2022 (https://www.who.int/publications/i/item/WHO-MPX-Clinical-and-IPC-2022.1).

24. Global Database for Tracking Antimicrobial Resistance (AMR) Country Self- Assessment Survey (TrACSS) [Online database]. Geneva: World Health Organization; 2023 (https://amrcountryprogress.org/#/visualization-view).

25. Organisation for Economic Co-operation and Development and World Health Organization. Addressing the burden of infections and antimicrobial resistance associated with health care focus on G7 countries. Paris: Organisation for Economic Co-operation and Development; 2022 (https://www.oecd.org/health/Addressing-burden-of-infections-and-AMR-associated-with-health-care.pdf).

Annex

Fig. A1: Five-year plan to achieve mpox control and elimination

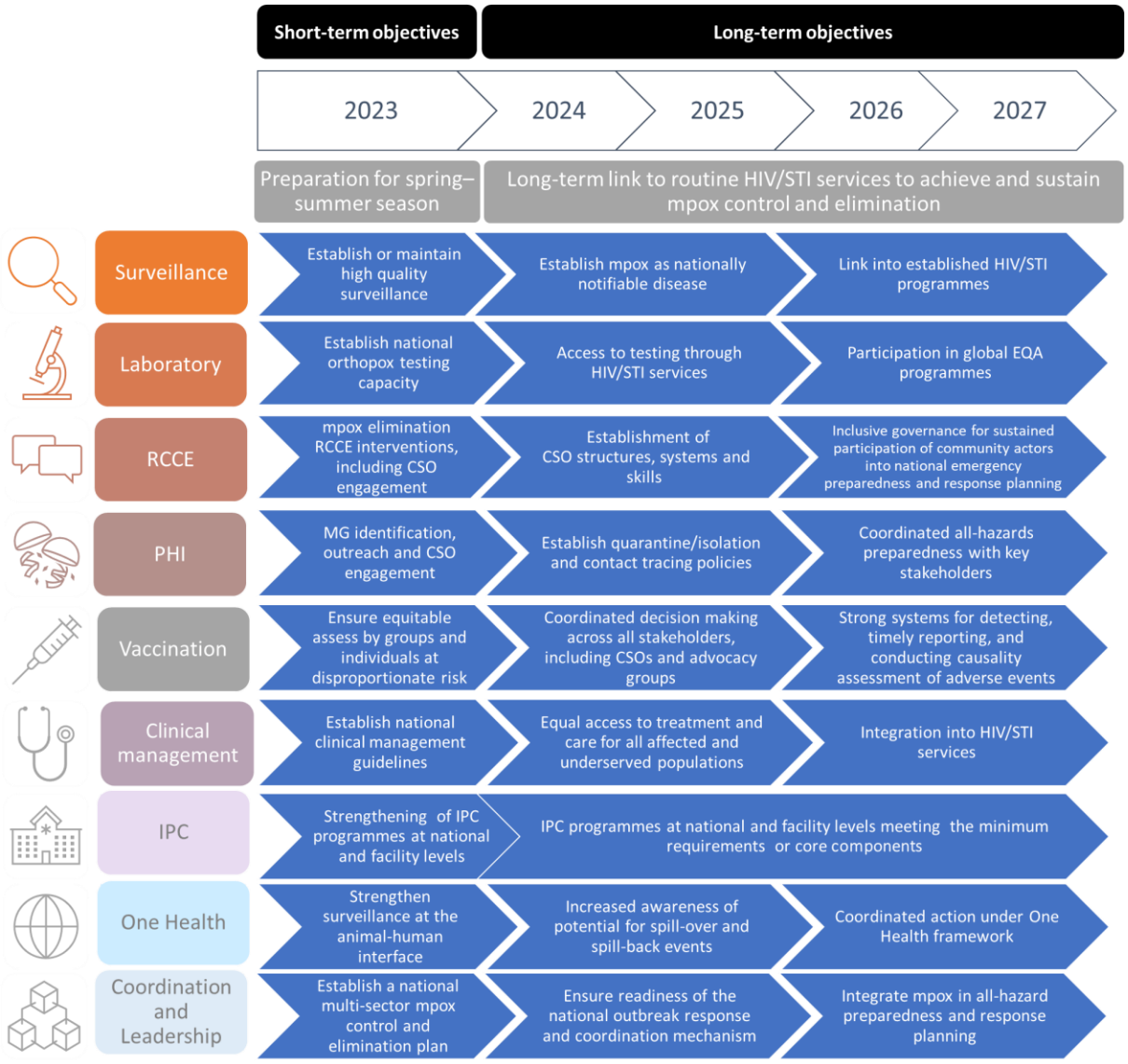


Table A1. Objectives to achieve mpox control and elimination

Technical areas	Objectives
Surveillance and analytics	To identify, investigate and test all suspected cases of mpox (imported and locally acquired) To determine importation status and route of transmission of all cases based on travel and exposure history To determine vaccination history of all cases To ensure complete case-based data for confirmed cases are reported to ECDC/WHO through TESSy system in a timely manner to monitor regional targets
Laboratory	To ensure rapid access to safe and quality-assured mpox real-time PCR testing for all suspected cases, either through on-site testing or through access to the network of international referral laboratories To undertake genomic sequencing of the virus and report genetic characterization data for all or at least a subset of laboratory confirmed cases in the publicly accessible databases such as GISAID
RCCE	To ensure all affected and susceptible populations have access to high-quality RCCE materials To ensure collaboration between health authorities and representatives of key affected populations To ensure that strong and pro-active anti-stigma and discrimination messages are given by governmental institutions
Public health interventions	To ensure all cases are rapidly informed of their status to enable behaviour modification to reduce transmission To ensure all close contacts are rapidly informed of exposure status and actions including by partner notification To ensure all mass-gathering events are assessed for risk of mpox amplification and technical assistance is provided as needed
Vaccination	To ensure that target groups are identified, based on behavioural and occupational exposure risks and that possible barriers to vaccine access and acceptance are identified To ensure all targeted groups are offered and continue to have equitable access to a complete pre-exposure course of mpox vaccine during the acute response and beyond To ensure presence of functional national vaccine safety monitoring systems for adverse events following mpox immunization
Clinical management	To ensure indicated persons are rapidly tested and receive appropriate mpox and STI clinical care To ensure active or enhanced passive antiviral safety surveillance is in place and safety signals are regularly assessed by national regulatory authorities
IPC	To ensure all MS maintain functional and operational IPC capacities in health-care settings
One Health	To ensure all MS continue to monitor potential spill-over and spill-back at the animal-human interface

Table A2: Indicators for Monitoring and Evaluation of mpox elimination and control programme

Intervention	Country indicator
Surveillance – ensure a well-performing surveillance system	Number of suspected cases identified per month Percentage of suspected cases tested (>95%) Number of local laboratory-confirmed cases per month Proportion of confirmed cases with complete information for selected variables (travel history, age, gender, date of onset etc.) reported to WHO and ECDC through TESSy (100%)
Laboratory – ensure a high-quality orthopoxvirus diagnostic system	National orthopoxvirus testing capacity[a] Number of laboratories enrolled in the WHO global EQA programme on mpox or another domestic or international mpox EQA programme Median turnaround time between identifying a suspected mpox case and laboratory confirmation[b] Percentage of mpox genetic sequence data shared on publicly accessible databases (100%)
RCCE – ensure high-quality risk communication and behavioural insights	Nationally co-ordinated response involving key affected populations Undertaking regular behavioural insight surveys in priority groups
PHI - ensure access and delivery of PHI to priority groups	Percentage of cases for which contacts were reached through contact tracing/partner notification Proportion of contacts offered post-exposure prophylaxis within four days of exposure
Vaccination – achieve high uptake in priority groups	Percentage of countries with access to mpox vaccine Percentage of national action plans that include pre- and/or post-exposure vaccine recommendations (75%) Percentage of countries with a functional surveillance system[c] to monitor vaccine adverse events (100%)
Clinical management – ensure optimal clinical management of all cases including severe cases	Treatment protocol in place for the management of cases cared for out of hospital (to ensure skin care, eye care and other measures to prevent complications) Timely access to appropriate treatment for severe cases and individuals at risk of serious outcomes (proportion of all cases) Treatment protocol for management of hospitalized cases in place
IPC – ensure risk of transmission in health-care setting minimized	Percentage of MS with an active national IPC programme is available according to WHO IPC core components guidelines Percentage of MS with National IPC manuals implemented and disseminated at facility levels Percentage of MS with National standards and resources for safe built environment are implemented at national and intermediate levels according to a national plan. As per SPAR indicators[d]

Notes: PHI; public health interventions

[a] at least one laboratory at the national level that has all necessary resources to test for mpox using real-time PCR, including trained staff, equipment, reagents and supplies, or direct access to an international referral laboratory.

[b] suggested target of 48 hours.

[c] e.g. meets general adverse event following immunization (AEFI) surveillance maturity indicators, such as sensitivity to detect 1–10 events per 100 000 vaccine doses administered, or 1 serious AEFI per 1 million population.

[d] International Health Regulations (2005): state party self-assessment annual reporting tool, 2nd ed. Geneva: World Health Organization: 2021 (https://apps.who.int/iris/handle/10665/350218, access date 24 April 2023).

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